

Driving Industrial Innovation On the Path to Exascale: *From Vision to Reality*

Dr. Rajeeb Hazra

Vice President, Datacenter & Connected Systems Group
GM, Technical Computing Group



Technical Computing Continues Its Rapid Growth

To Compete, You Must Compute

Governments & Research



Budget: Euro 1 Billion

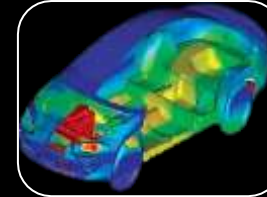
"My goal is simple. It is complete understanding of the universe, why it is as it is and why it exists at all"

Stephen Hawking

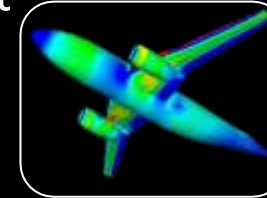
Fundamental Discovery to Gain Fundamental Insights

Commercial/Industrial

Better Products



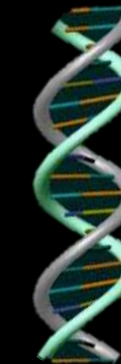
Faster Time to Market



Reduced R&D

Business Transformation

New Users – New Uses



Genomics



Clinical Information



*From
Diagnosis to
personalized
treatments
quickly*

Big Data Analytics Enabling Data Driven Science

HPC: Transforming the world of data and information into KNOWLEDGE



From Vision to Reality: Designed Without Prototypes!

"For Audi to stay on the forefront of automotive design, we required a new way to visualize our designs. Working with Intel and Autodesk, we have been able, **for the first time,** to adopt **Real Time Predictive Rendering** to interactively see our car design concepts with high fidelity visualization. This helps us reduce the costs of development by **eliminating expensive prototype turns**"

-- Audi



Future Intel® Xeon® Processor E5-2600 V2 family
Intel® True Scale Fabric
Show floor demo: 52 nodes



Intel in HPC: In 2009

Processors



Software



Intel® Enterprise
Edition for Lustre*
software



Intel in HPC: In 2013+

Processors



Coprocessor



Fabrics

Intel® Truescale

Intel® Ethernet
Products

Next Generation
Interconnects

Software



Intel® Enterprise
Edition for Lustre*
software

...With Continued Innovation Across All Aspects of HPC



Redefining Compute: *Neo-Heterogeneity* at Scale

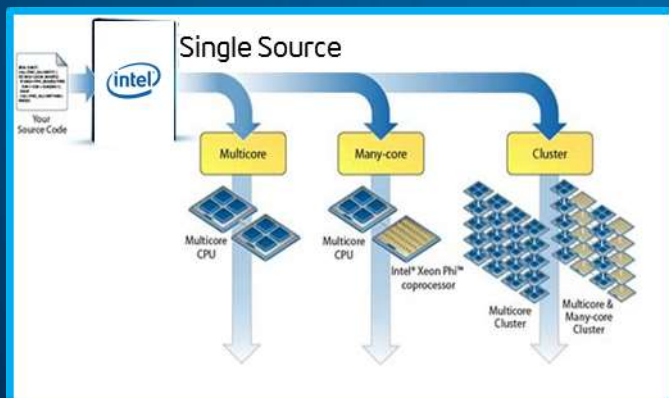
IDC HPC End-User MCS Study:
Overall Plans For Purchasing Coprocessors



Q: What is your likely accelerator/co-processor purchase plans for your NEXT technical server purchase?

- 78.4% said YES - they plan to purchase coprocessors with their next HPC server
- This is more than double the 29.5% from our 2011 HPC End-User MCS study

Heterogeneity is here to stay...
...but it doesn't have to be **HARD**



Neo- Heterogeneity =
Heterogeneous system
with a single programming model

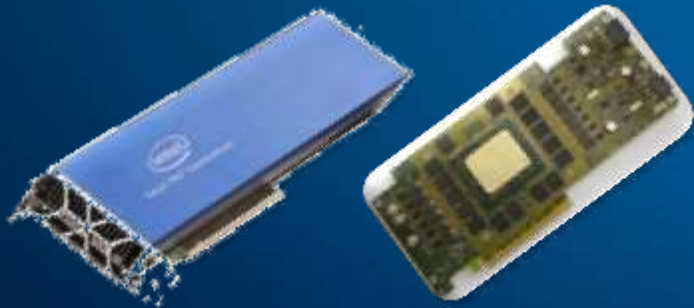
IDC Intersect360

Multiple Surveys:
Increasing Intel Xeon Phi
user preference for future buys



Announcing Today: New Intel® Xeon Phi™ Coprocessor Products

7100 Family: Highest Performance Most Memory



7120P

7120X

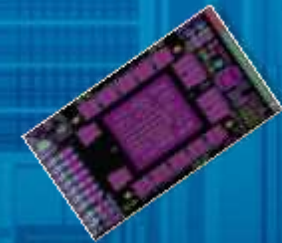
3100 Family: Performance & Value



3120P

3120A

5100 Family: High Density Form Factor



5120D

Next Intel® Xeon Phi™ Processor: **Knights Landing**



Designed using
Intel's cutting-edge
14nm process

Not bound by "offloading" bottlenecks
***Standalone CPU or
PCIe coprocessor***

Leadership compute & memory bandwidth
**Integrated
on-package memory**



A map of China is shown in a light green color against a dark blue background. A red star is placed on the southern coast of China, indicating the location of Guangzhou. The background also features a faint, grid-like pattern of light blue lines.

The Pinnacle of Neo-Heterogeneity Today

Guangzhou

Prof. Liao's Vision

100PF Project Vision 2015

Competency.

Programmability.

Reliability.

Continuity.



50PF Reality 2013

#1 system on top500!

MilkyWay-2

54.9PF Peak Performance

33.86PF Rmax

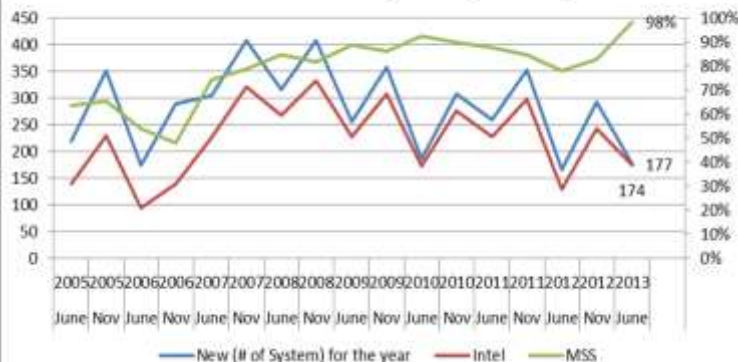
>32000 Intel® Xeon® Processor
E5-2600 v2 family

>48000 Intel® Xeon Phi™
Coproprocessors

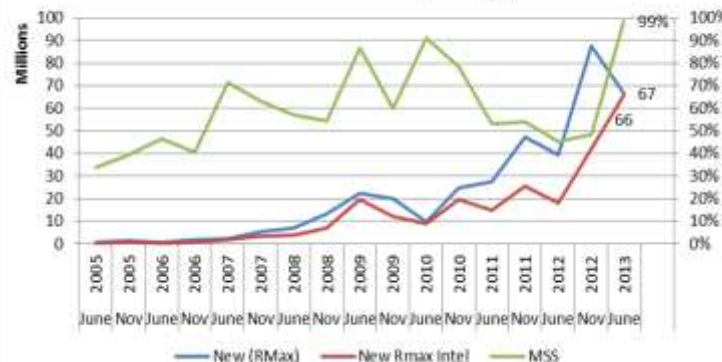


Top 500 Highlights

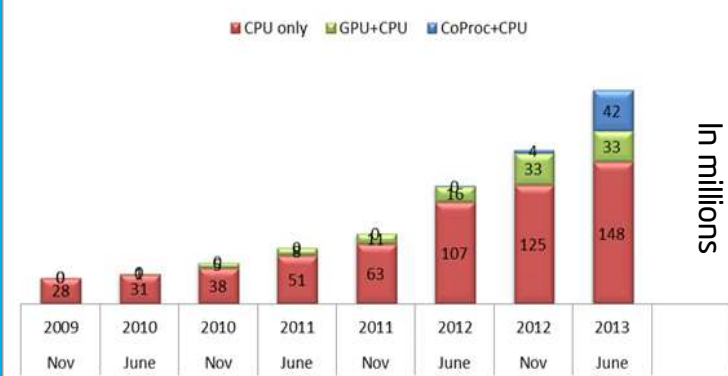
New on the List (# of Systems)



New on the List (GFlops)



Top500 GFlops Co-processor / Accelerators



Highlights

403 of 500 (81%) of all systems chose Intel

174 of 177 (98%) of new systems chose Intel

Total Rmax of Intel Xeon Phi > total Rmax of GPUs

Intel® Xeon Phi™ coprocessor

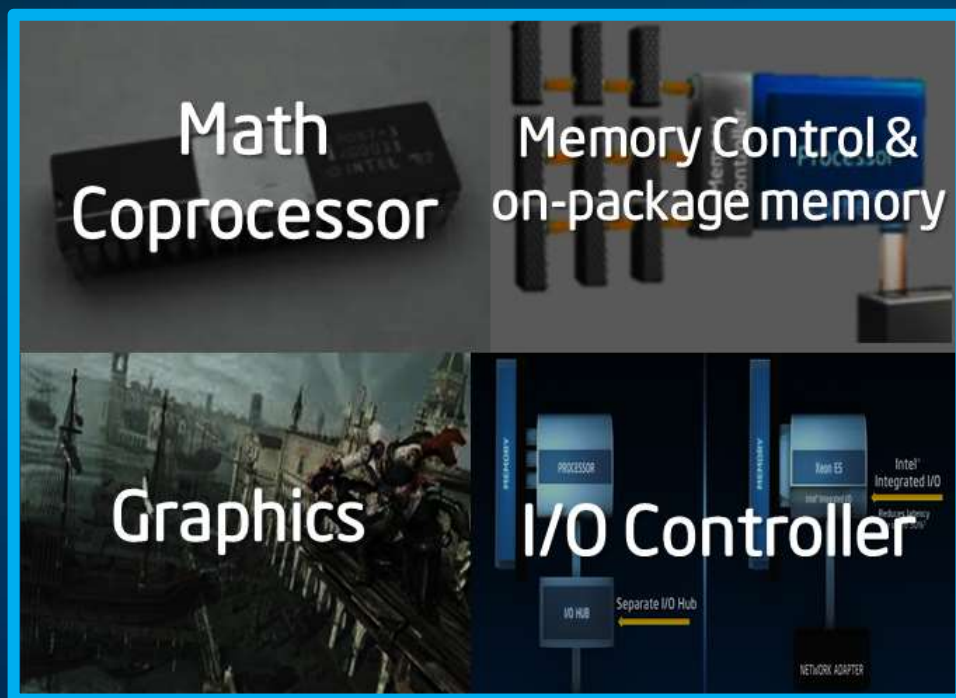
- Top10 systems: #1 and #6 system on list
 - #6 system: 5.3 PF TACC Stampede

Intel® Xeon® processor

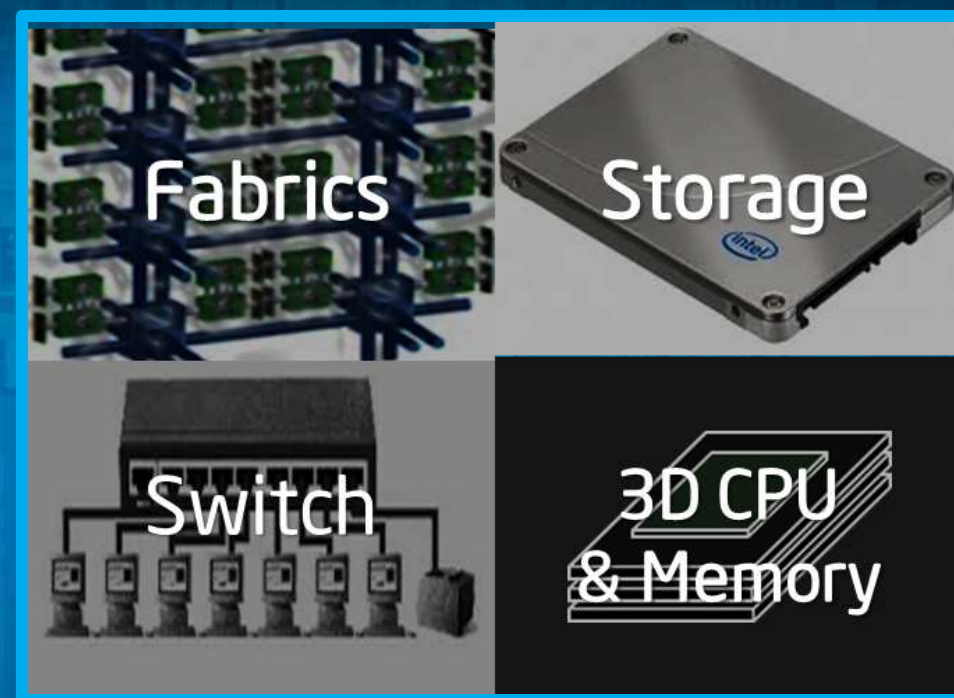
- 98% of new listings based on Intel
- 1st listing of Intel Xeon E5-2600 V2 processor
- 56% performance increase vs. prior generation

Integration Is The Key

Unprecedented Innovations Only Enabled by the Leading Edge Process Technology



Integrated Today



The Possibilities For Tomorrow

System level benefits in cost, power, density, scalability, & performance



HPC: Transforming Information & Data Driven Science Into Knowledge

Intel Is Responding to Key Challenges & Market Needs...

Processors

Coprocessor

Fabrics

Intel® Truescale

Intel® Ethernet Products

Next Generation Interconnects

Software

Intel® Enterprise Edition for Lustre® software

...With Continued Innovation Across All Aspects of HPC

Integration Is The Key

Unprecedented Innovations Only Enabled by the Leading Edge Process Technology

Math Coprocessor

Memory Control & on-package memory

Graphics

I/O Controller

Integrated Today

Fabrics

Storage

Switch

3D CPU & Memory

The Possibilities For Tomorrow

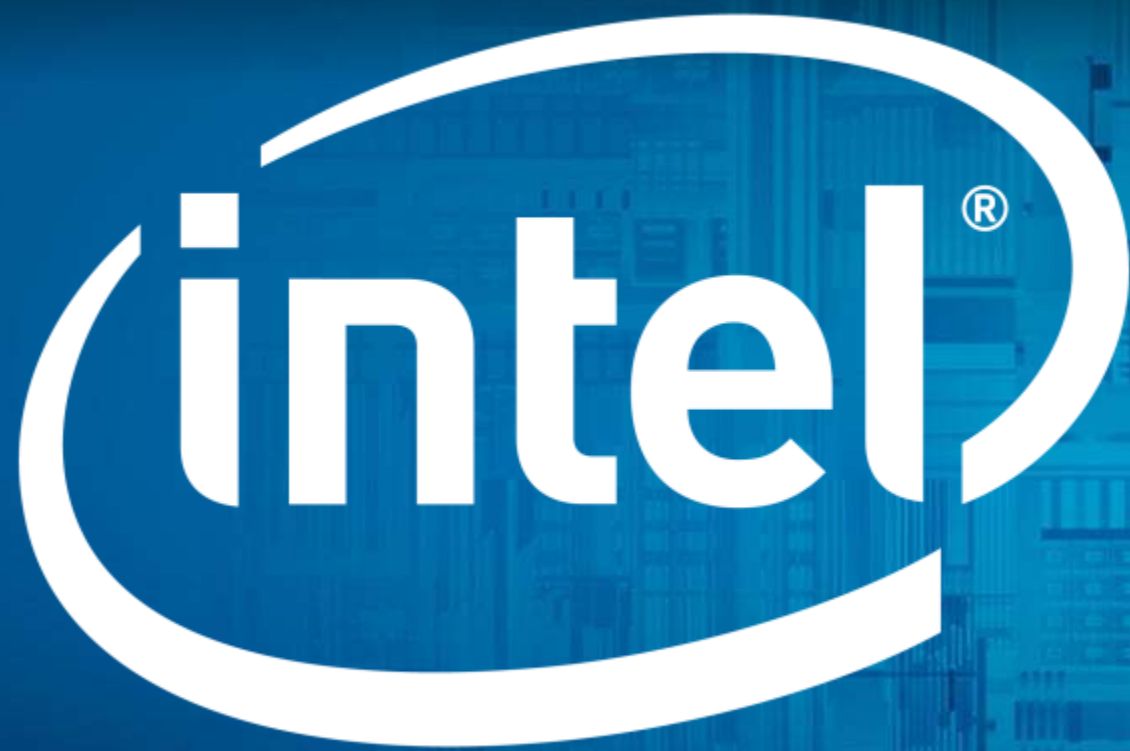
System level benefits in cost, power, density, scalability, & performance

This decade we will create and extend computing technology to connect and enrich the lives of every person on earth



On to Exascale:
Innovation and partnerships





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